

SEEDS Workshop Breakout on Metrics Planning and Reporting (MPAR)
Thursday (February 7, 2002) A.M.

A. Topics discussed:

- **Current structure of DAACs, ESIPS, RESACS, etc.**
- **Stewardship for data (long-term)**
- **Governance – responsibility and authority – funding flow, AO language, evaluation process, post-award evaluation and management**
 - **Not one size-fits-all management, but management controls appropriate to provider-type**
- **Concern about data system part of a PI-proposed mission receiving insufficient attention and being cut when the flight-hardware has cost overruns**
- **Charging for data and its impacts on metrics**
- **Metrics**
 - **Multiple points of view on metrics:**
 - **NASA reporting aggregate (GPRA) metrics to Congress/OMB**
 - **Success measures for dissemination/delivery system – user satisfaction**
 - **Success measures for individual performing entities to help NASA with funding decisions**
 - **Expectations of one type of data provider on another**
 - **Expectations of an end user community on its providers**
 - **Internal management tools for a given data provider**
 - **GPRA metrics and time lag in getting them changed (2 years)**
 - **Need for meaningful metrics that measure real value for the money spent**
 - **Technical difficulties in collecting metrics**
 - **Privacy and intellectual property considerations**
- **Volunteers to participate in study – Frank Lindsey, Don Collins, Hank Wolf**
- **Need for more questions on accountability**

B. Summary of Key Points for Metrics Planning and Reporting Study:

1. Where are the responsibility / accountability elements for ESIPs and RESACs?
 - we need to define accountability (deliver what you have promised?)
 - we need to define value (which will vary based on the purpose of the metrics collected)
2. Levels of accountability are missing in the study's question list. The list needs more direct questions that deal with accountability.
3. Metrics collection offers an opportunity for corrective action, advertising and showing successes.
4. Metrics vary according to the intended recipient, e.g., the level and resolution of metrics is different for GPRA (for OMB), ESDIS Science Operations Office (SOO) management and a DAAC manager (to manage day-to-day operations).
 - we need to define success for each of the metric viewpoints (e.g. Level I, user can complete their workload better, faster, less expensively than without what the delivery system provides)

5. The study team should review the Federation's metrics processes and protocols as a body of lessons learned.
6. Measuring "value" is important for agency programs and projects, budget documents, and for public knowledge / dissemination. There is no simple answer on how to do this and it varies as a function of Level
7. The science community is still grappling with how to collect metrics for data set citations in the literature.
8. When asked, "What metrics do you expect from other data centers / data service providers" one answer was: "Production/throughput statistics (end-to-end), spacecraft and instrument status, status on data flows and changes in algorithms -- all reported in active Web pages that give end-to-end status. Knowing status of problem areas is critical."
9. There are no meaningful measures for science right now, beyond peer review publication.
10. The success of ESE Programs from an external point of view depends on the success of both the scientific users and the data centers that serve them. We need to be aware of and understand the differences between science metrics and data center metrics.
11. The study must address the effect of multiple sponsors on metrics reporting, accountability, and priority / goal setting.
12. Any mechanism for accountability has to consider the size and scale of a data center or data service provider.
13. The study questions should address how goals and priorities are set, both by an activity and by an activity's sponsor, and their interactions/conflicts.
14. Other sites to interview: NSF, DOE, LASP, Vexcel, financial community.

C. Summary of Key Points for SEEDS in general (not necessarily for MPAR Study):

1. The current federation structure was initially disjointed with little cross communications. Bottom-up formation of technology/science clusters among ESIPS demonstrated that disparate entities with a minimal common goals could work together to achieve large scale successes in management, science and technology.
2. There is a potential for lack of data stewardship across entities in the SEEDS environment.
3. Potential exists for conflicts of interest, privacy issues, and business proprietary problems with ESIP-3s.
4. If NASA is going to charge for data (distribution), it has to establish NASA-wide policy that addresses uniformity across all system components (DAACS, ESIPs, RESACs, etc.)
 - No, a cost of operating within SEEDS is to provide data/information in the format that the user expects it regardless of how it entered the providers system.
5. If SEEDS will not be a funding source, how effective will its authority be?
6. SEEDS needs to be a strong voice in on-going missions

(Comments 5 and 6 above generally refer to the current, unaddressed concerns of governance, management, and authority in the "SEEDS era".)

D. Details of discussion

Don Collins –

- The overall structure of what we have; DAACs, ESIPS 2 and 3, RESACs, Infomarts, etc. has come about in a disjoint way. Federation's purpose is more to communicate technology between entities. Structure guarantees that nobody gains control. However, it is not useful for governance. Long-term stewardship of data is lacking in the federation structure. Missing from ESIP 2 and RESACs is responsibility for data after the activity is completed. Somebody needs to be responsible for long-term stewardship.
- A potential problem is the conflict of interest between commercial activities on data and some other layer in the same organization. This can happen when the same organization has both a commercial and research activity. Should be careful in structuring applications areas where a commercial entity has a profit potential and may not want open sharing of research results and data.
- This has not happened in ESIP 3s which is surprising. This may be because many of them started from scratch.
- DAACs have been directed to charge for data – if NASA will pursue this, then there ought to be some uniform policy across all data providers. Competitive selection of many if not all elements is valuable. The playing field should be leveled and provision of data and services should be prevented from becoming a cut-throat business.
- Cost of Billing and Accounting (B&A) itself is high and need some volume of sales before it is worth implementing and maintaining. Therefore it poses undue hardship for smaller data providers. NOAA NODC was recovering only enough to get a couple of workstations a year!
- Special “barter” arrangements can be made with individuals/groups that have special (heavy) requirements
- Backbone Data Centers (BBDC – a.k.a. today's DAACs) are expected to be responsible long-term stewardship for the foreseeable future. We don't see transition to LTA happening soon.

Discussion about Charging for Data:

Bruce Barkstrom – On ERBE the ones that were most productive were people with most appetite for data. There were only one or two such users.

Don Collins - Funding mechanisms are not an issue here. We need to address what the degrees of accountability should be. We should pass it down through the contracting mechanisms.

Bruce Barkstrom – With very high volume data users, it is not just the cost or bandwidth out that we should be concerned about. We need to build special mechanisms. For

example, such users should pass a peer review process. The User Working Groups (UWG) for the data centers could do this to prioritize allocation of resources. Could institute barter to cover costs of servicing high volume users.

Hank Wolf - One needs to look at various contracting mechanisms with respect to charging for data. Especially when data are involved for research and education and graduate students' thesis work depends on it, we should make sure that the government can supply the data. Otherwise, we may not be able to do the work.

Metrics:

Hank Wolf – Metrics are for collection and reporting to GPRA program. They also allow us to better understand how we are operating. We can use it as an early alarm system leading to system corrections. It should apply at the SEEDS level as well individual project level

Don Collins – The metrics needed for NASA reporting are different what we need to manage our systems. We need to define more meaningful metrics.,

Frank Lindsay – Initial metrics for the ESIP Federation came from Martha Maiden. Federation added about 10 of them to define meaningful items. Type 3ESIPs have a different set of metrics that involve financial issues. The “value question” needs to be answered.

Don Collins – We would like to quantify value of changes made to a system or a data center, for example, to be able to manage (the system or data center).

Hank Wolf – It took a lot of arguments in the Federation to arrive at the concept of “nuggets”. A nugget is defined as a “success story”.

Frank Lindsay – Nuggets gave a free text method of submitting information about accomplishments. To get quantitative metrics, we add up the nuggets and get a number that is reported. One drawback of this is that the nuggets are all weighted equally. Greg Withee (NOAA) asked about Federation metrics– he was concerned that it was unmanaged and all are counted the same way. Need some authority that reviews it. Perhaps, a review panel can be used to manage the process.

Don Collins – DAACs have been required to report on kudos and complaints. Thus, we also have to record when there are failures. Kudos can be counted as nuggets.

Frank Lindsay – Counting publications that use the data is a good measure, but hard to gather.

Hank Wolf – as academic committees become comfortable with accepting electronic publishing, it should be easier to count publications that use a given piece of data (or services from a data center).

Frank Lindsay – Do stories about satisfied customers have impact?

Don Collins – We have not heard feedback on how such stories get used (in reporting up through NASA HQ).

Expectations of one type of user/provider (e.g. SDC) from others (e.g., BBDC):

Ramapriyan – What would your expectations be if you operate a Science Data Center (SDC) expecting services from a Backbone Data Center (BBDC), for example?

Hank Wolf – Our ESIP, a mini Federation, incorporates GDAAC as one of key players. We operate as an integrated set of activities.

Don Collins - If I were running a SDC, I would not be concerned about the overall activities of the BBDCs. I would be concerned about the particular levels of data that I am interested in. General health and sustainability of the activity would be of some concern. I would be interested in throughput, anything that interrupts the flow of data. Changes in production strings, changes in algorithm, processing status, status of algorithms, outages that are noted on status web page from the BBDC.

Bruce Barkstrom – We should be able to negotiate schedule, throughput between SDC and BBDC.

Don Collins – PODAAC to flight projects relationship is similar; we want to know what their processing is doing; we want to know when and where there are problems.

Privacy and Intellectual Property Issues:

Frank Lindsay – A challenge if ESIP 3s become part of SEEDS is that they don't necessarily want the world to be viewing their metrics.

Bruce Barkstrom – There is a related issue on intellectual property rights.

Frank Lindsay – Bob Chen (SEDAC) has said that some of the stories written into the DAACs cannot be used without permission of the persons providing them.

Anngie Johnson – We just need some proof of how they have provided value for your money. There should be no proprietary issues here. If there are concerns about proprietary information, you need to be careful about what you send forward to HQ in a report, because it may be put in a database accessible to whoever requests it. If it is proprietary, do not send it.

More on Metrics:

Anngie Johnson – Quarterly, I used to roll up GPRA metrics (for reporting at HQ). The problem is that metrics were not particularly meaningful. What we need to show is what the value for our investment is. How is it affecting society's needs? Look at it from the point of view of having to explain NASA's accomplishments to your neighbor.

Chris Lynnes – The end goal is to enable the solution of science questions. Has anybody looked at looking at tracking science papers using the data that are accessed? We have done some text mining to try to do this.

Anngie Johnson – Use of AVHRR for fire information is an example of a good benefit.

Bruce Barkstrom – We don't have a way of doing a good cost benefit analysis. An example of what we can use is how many faculty and graduate students have been supported by the program and what their accomplishments are.

How do you separate measures of success between Data Centers and scientists when papers are published?

Frank Lindsay – A metric Congress used recently was “if you shut off the Data Center how many people will complain?” We announced that our data center would be closed (when the negative earmark had been put in by Congress for ESIP funding) and heard a

lot of complaints. This is not an experiment you can repeat frequently and get meaningful answers!

Hank Wolf – When people use anonymous ftp to transfer data, you don't necessarily know who they are. We only know how many, but not who. Therefore, it is hard to track usage.

Frank Lindsay – Users should be required to supply some information before getting data by ftp so that we can gather the statistics

Claude Freaner – If it does slow someone to give a registration information, user should have no qualms about establishing an account – it does not cost him/her anything.

Chris Lynnes – We will have a lot of operational management load if we try to do this.

Claude Freaner – It may be useful to get customer feedback by providing a URL to click on

Chris Lynnes – Before we “outlaw” anonymous ftp (in order to get better usage statistics) we should talk to the user community.

Anngie Johnson – It would be useful to talk to NSF people regarding the types of metrics they are using to measure the value they are getting for their investment (Andrea Norris, formerly from NASA HQ, is now at NSF). I will also provide other points of contact at NSF.

Chris Lenhardt – Dedicated peer-reviewed “SEEDS” journal would be useful; focused conferences. It would also be useful to look into institutional requirements (e.g., SEDAC @ Columbia) – institutional reviews take time and effort and placing more requirements for metrics collection could be burdensome

4 points of view on metrics:

- **NASA reporting aggregate (GPRA) metrics to Congress/OMB**
- **Success measures for individual performing entities to help NASA with funding decisions**
- **Expectations of one type of Data Center on another**
- **Internal management tools**

Frank Lindsay – Smaller providers see that providing metrics is an unfunded burden. It is easier for DAACs to do this than for small ESIPs. In the last federation meeting we had a discussion that every member of the federation should provide metrics – but the measure was defeated.

Vince Troisi – An issue to be considered is how frequently and when metrics should be reported.

For the metrics to be used for GPRA, it is important to give some serious thought, because, it takes about 2 years for the GPRA metrics to be changed through the system. It is necessary to pay attention to how the metrics play out in the upper echelons of management.

Questionnaire discussion:

Don Collins – questions are addressing organizational issues, budget, spending, etc. However, there is not much on accountability. Victor Zlotnicki addresses the issue of

accountability in his white paper about to be submitted to the SEEDS Workshop. He believes SEEDS should be more than a standards organization. SEEDS ought to take on some measure of management and coordination of data activities. Need to have a few questions on accountability mechanisms. Accountability can be directed – e.g. IT security. These would be different for the different kinds of data centers. ESDIS does not do this well enough because GSFC, EDC, LaRC are managed the same way as SEDAC, ORNL. It is an entirely different picture for ESIPs of type 2.

Vince Troisi – We should look at scalability with respect to accountability and management oversight.

Don Collins – Associated with accountability, there is authority. The managing program organizations needs to be proactive and firm as necessary and provide appropriate levels of autonomy depending on mission criticality. Management should be with as light a touch as possible. Also, we should recognize that some activities will fail.

The Announcements of Opportunity (AO) should have language that clearly states standards and expectations. Drafting the AO and evaluation process should include the SEEDS organization. What is the role of SEEDS in management once the AO funding is let?

Anngie Johnson – Jack Kay is a member of CCB at HQ and if an implementing project wants to be exempt from some requirements (or wants more \$s), SEEDS can come to the table and argue about it.

For SEEDS to be effective it has to have a strong voice in on-going missions.

It is useful to ask who sets goals and priorities (in the questionnaire)

There should be a “champion” for SEEDS.

If SEEDS is not providing money, how will they have control?

Don – The only thing that SEEDS will be able to do is influence the AO language and evaluation process. Write appropriate words into the PIs success criteria.

Suggested Additions to “Visit list”:

NSF, DOE processing center, NOAA community, Geophysical community, LASP, companies developing applications (e.g. Vexcel), Financial community.